UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/661,747	09/12/2003	Steven K. Korotky	Korotky 28 (LCNT/125465)	8140

46363 7590 04/02/2009

WALL & TONG, LLP/
ALCATEL-LUCENT USA INC.
595 SHREWSBURY AVENUE
SHREWSBURY, NJ 07702

EXAMINER	
ISOM, JOHN W	

ART UNIT	PAPER NUMBER
2447	

MAIL DATE	DELIVERY MODE
04/02/2009	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/661,747	KOROTKY, STEVEN K.	
	Examiner	Art Unit	
	John Isom	2447	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE _3_ MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on _12 September 2003_.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) _1-38_ is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) _1-38_ is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on _12 September 2003_ is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _09/12/2003 and 11/14/2008_.

4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .

5) ☐ Notice of Informal Patent Application

6) ☐ Other: _____.

DETAILED ACTION

1. Claims 1-38 are pending.

Specification

2. The disclosure is objected to because of the following informalities:

- At page 4, line 27, please amend "apriori" to "a priori".
- At page 14, line 25, please amend "provided then" to "provided, then".
- At page 25, line 17, please delete the second occurrence of "strategy".
- At page 40, line 3, please amend "note" to "~~note~~ node".
- At page 41, line 5, please delete "and".
- At page 50, line 12, please amend "such the" to "such as the".

Appropriate correction is required.

3. The specification is objected to as failing to provide proper antecedent basis for the claimed subject matter. See 37 CFR 1.75(d)(1) and MPEP § 608.01(o). Correction of the following is required:

- The specification fails to provide antecedent basis for the limitation "$\langle \kappa \rangle \cong 4\langle h \rangle / L$" in the 4th line of claim 28.
- The specification fails to provide antecedent basis for the limitation "a ratio of cost of transmission and bandwidth management" in claim 33.
- The specification fails to provide antecedent basis for "a computer-readable medium" in claim 36.

Claim Objections

4. Claims 1-4, 8, 9, 13, 15, 20, 21, 27-29 and 36-38 are objected to because of the following informalities:

- In the 1st line of claim 1, please delete “the”.
- In the 2nd line of claim 1, the limitation “required” is indefinite.
- In the 4th line of claim 1, please amend “network variables” to “required network variables”.
- In the 2nd line of claim 2, the limitation “minimum” is indefinite.
- In the 2nd line of claim 2, please amend “required” to “the required”.
- In the 1st line of claim 3, please amend “the variance of the” to “~~the~~ a variance of ~~the~~ a”.
- In the 3rd line of claim 3, the symbol “σ^2” is undefined.
- In the 3rd and 5th lines of claim 3, the symbol “(W^0)” is undefined.
- In the 4th and 5th lines of claim 3, the symbol “σ” is undefined.
- In the 4th line of claim 3, the symbol “$(W_{B/E})$” is undefined.
- In the 4th line of claim 3, the symbol “$\langle W_{B/E} \rangle$” is undefined.
- In the 4th line of claim 3, the symbol “$\langle \delta \rangle_n$” is undefined.
- In the 4th line of claim 3, the symbol “$\langle 1/\delta \rangle_n$” is undefined.
- In the 4th line of claim 3, please amend “;” to “; and”.
- In the 5th line of claim 3, the symbol “σ_d” is undefined.
- In the 5th line of claim 3, the symbol “(d)” is undefined.

- In the 6th line of claim 3, please amend “the expectation value of the” to “~~the~~ an expectation value of ~~the~~ a”.
- In the 7th line of claim 3, please amend “the expectation value of the” to “~~the~~ an expectation value of ~~the~~ a”.
- In the 8th line of claim 3, please amend “the average” to “~~the~~ an average”.
- In the 8th line of claim 3, please amend “the mean” to “~~the~~ a mean”.
- In the 1st line of claim 4, please amend “the ratio” to “~~the~~ a ratio”.
- In the 3rd line of claim 4, the symbol “$\langle \rho' \rangle$” is undefined.
- In the 2nd line of claim 8, please amend “the number” to “~~the~~ a number”.
- In the 3rd line of claim 9, the symbol “$\langle W^0 \rangle$” is undefined.
- In the 4th line of claim 9, please amend “the expectation value of the” to “~~the~~ an expectation value of ~~the~~ a”.
- In the 5th line of claim 9, please amend “the average” to “~~the~~ an average”.
- In the 5th line of claim 9, please amend “the mean” to “~~the~~ a mean”.
- In the 3rd line of claim 13, the symbol “$\langle h \rangle$” is undefined.
- In the 4th and 5th lines of claim 13, please amend “the average” to “~~the~~ an average”.
- In the 2nd line of claim 15, please amend “the number” to “~~the~~ a number”.
- In the 2nd line of claim 20, please amend “the number” to “~~the~~ a number”.
- In the 3rd line of claim 21, the symbol “$\langle P^{\kappa} \rangle$” is undefined.
- In the 4th line of claim 21, please amend “the expectation value of the” to “~~the~~ an expectation value of ~~the~~ a”.

- In the 5th line of claim 21, please amend “the extra” to “~~the~~ an extra”.
- In the 5th line of claim 21, please amend “the average” to “~~the~~ an average”.
- In the 6th line of claim 21, please amend “the mean” to “~~the~~ a mean”.
- In the 2nd line of claim 27, please amend “the number” to “~~the~~ a number”.
- In the 1st line of claim 28, please amend “claim 1” to “claim 27”.
- In the 3rd and 4th lines of claim 28, the symbol “$\langle\kappa\rangle$” is undefined.
- In the 4th line of claim 28, the symbol “L” is undefined.
- In the 5th line of claim 28, please amend “the average” to “~~the~~ an average”.
- In the 6th line of claim 28, please amend “the mean” to “~~the~~ a mean”.
- In the 2nd line of claim 29, please amend “the extra” to “~~the~~ an extra”.
- In claim 36, the language following the recitation “[a] computer-readable medium” is not limiting, because the set of instructions is not positively recited as being stored on the computer-readable medium.
- In the 3rd line of claim 36, the limitation “required” is indefinite.
- In the 5th line of claim 36, please amend “network variables” to “required network variables”.
- Claim 37 does not further limit claim 36 from which it depends, because the method of claim 36 is not limiting thereof.
- In the 3rd line of claim 37, the limitation “minimum” is indefinite.
- In the 3rd line of claim 37, please amend “required” to “the required”.

- In claim 38, the language following the recitation “[a] computer-readable medium” is not limiting, because the set of instructions is not positively recited as being stored on the computer-readable medium.
- In the 1st line of claim 38, please delete “the”.
- In the 4th line of claim 38, the limitation “required” is indefinite.
- In the 6th line of claim 38, please amend “network variables” to “required network variables”.

Appropriate correction is required.

Claim Rejections - 35 USC § 101

5. 35 U.S.C. 101 reads as follows:

> Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

6. Claims **1-35 and 38** are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter.

Claims **1-35** are rejected under 35 U.S.C. 101 as not falling within one of the four statutory categories of invention. While the claims recite a series of steps or acts to be performed, a statutory “process” under 35 U.S.C. 101 must (1) be tied to a particular machine, or (2) transform underlying subject matter (such as an article or material) to a different state or thing. *In re Bilski*, 545 F.3d 943, 961, 88 USPQ2d 1385 (Fed. Cir. 2008). The instant claims are neither positively tied to a particular machine that accomplishes the claimed method steps, nor do they transform underlying subject matter. Therefore, they do not qualify as a statutory process. The claimed method,

which includes steps to determine variables using a mathematical expression, is broad enough that the claim could be completely performed mentally or verbally, without a machine. Furthermore, no transformation is apparent. Therefore, the claims are not statutory.

Claim **38** is drawn to a computer program product comprising software. The claim lacks the necessary physical articles or objects to constitute a machine or a manufacture within the meaning of 35 U.S.C. 101. Furthermore, the claim does not positively comprise a series of steps or acts to be a process. Moreover, the claim is not a combination of chemical compounds to be a composition of matter. As such, the claim fails to fall within a statutory category. It is, at best, functional descriptive material *per se*. Therefore, the claim is not statutory.

Claim Rejections - 35 USC § 102

7. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

8. Claims **1-3, 5-11, 14-20, 22-27 and 29-35** are rejected under 35 U.S.C. 102(b) as being anticipated by **Baroni et al.** ("Wavelength Requirements in Arbitrarily Connected Wavelength-Routed Optical Networks", *Journal of Lightwave Technology*, vol. 15, No. 2, February 1997, pp. 242–251) (hereinafter referred to as "Baroni").

With regard to claim **1**, Baroni teaches: A method for quantifying the needs and costs of a network, comprising:

determining quantities of required network variables using closed-form mathematical expressions for network-wide expectation values for mean quantities of the network variables (page 245, Table 1 and equations (4) and (5); page 248, equation (9)).

With regard to claim **2**, Baroni teaches: The method of claim 1, further comprising:

determining variations of a minimum number of required network variables using said mathematical expressions (page 245, 2nd column, 2nd full ¶; page 246, 1st column, 2nd ¶).

With regard to claim **3**, Baroni teaches: The method of claim 2, wherein the variance of the number of demands appearing on a link is determined using at least one of the following equations:

$\sigma^2(W°) \leq \langle W° \rangle \, [1 - 1/\langle h \rangle]$;

$\sigma\,(W_{B/E}) / \langle W_{B/E} \rangle \cong \{\, [\langle \delta \rangle_n \, \langle 1/\delta \rangle_n - 1] / 2 \,\}^{½}$;

$\sigma_d(W°) / \langle W° \rangle = [2/\langle h \rangle][(\sigma(d)/\langle d \rangle]$;

wherein $\langle W° \rangle$ depicts the expectation value of the number of demands carried on the link, $\langle h \rangle$ depicts the expectation value of the number of hops on the link, $\langle \delta \rangle$ depicts the average degree of nodes, and $\langle d \rangle$ depicts the mean number of demands terminating

at a node (i.e., the expectation value of the number of demands carried on a link, is given by equation (9) on page 248. The fact that a path is chosen randomly from among those having the minimum number of hops (page 244, 1st column, 5th full ¶), implies that the probability that any one link is selected is greater than or equal to 1/h. Using these facts and the properties of the binomial distribution, the corresponding variance may be determined (*see* “The Binomial Distribution”, Yale University, 1997, <http://www.stat.yale.edu/Courses/1997-98/101/binom.htm>, page 2)).

With regard to claim **5**, Baroni teaches: The method of claim 1, wherein said network variables are variables selected from the group consisting of network elements, subsystems and components (i.e., the variables in Table 1 are topological features of networks (page 244, 2nd column, 1st ¶ under the heading “V. Results”)).

With regard to claim **6**, Baroni teaches: The method of claim 1, wherein a communication demand model and a network graph, defined by a set of nodes and a set of links, provide inputs for the mathematical expressions (page 243, last ¶ in 1st column, and Figure 1).

With regard to claim **7**, Baroni teaches: The method of claim 1, wherein the mathematical expressions require inputs selected from the group consisting of a number of network nodes, a number of links and a number of demands in said network

(page 248, equation (9); the number of demands at a node is given by N-1 (page 243, 2nd column, 1st ¶)).

With regard to claim **8**, Baroni teaches: The method of claim 1, wherein said mathematical expressions comprise equations for calculating a local value of the number of demands appearing on a link or carried on a means of transmission (i.e., the number of demands on a link is given by equation (9)).

With regard to claim **9**, Baroni teaches: The method of claim 8, wherein the number of demands is determined using the following equation:

$\langle W^\circ \rangle = \langle d \rangle \langle h \rangle / \langle \delta \rangle$;

Wherein $\langle h \rangle$ depicts the expectation value of the number of hops on the link, $\langle \delta \rangle$ depicts the average degree of nodes in the network, and $\langle d \rangle$ depicts the mean number of demands terminating at a node (i.e., substituting equation (4) and the average number of demands at a node = N – 1, into equation (9), gives the equation in this claim).

With regard to claim **10**, Baroni teaches: The method of claim 8, wherein said demands comprise at least one demand selected from the group consisting of uniform demands, random demands, and distance dependent demands (page 243, last ¶ in 1st column).

With regard to claim **11**, Baroni teaches: The method of claim 8, wherein said means of transmission comprises an optical line system or a multi-wavelength optical line system (Abstract).

With regard to claim **14**, Baroni teaches: The method of claim 1, wherein said mathematical expressions comprise equations for calculating a global mean value or a local value of a number of transmission subsystems (page 245, Table 1 and equations (4) and (5); page 248, equation (9)).

With regard to claim **15**, Baroni teaches: The method of claim 1, wherein said mathematical expressions comprise equations for calculating a variance of the number of transmission subsystems (page 245, 2nd column, 2nd full ¶; the calculation of standard deviation implies calculation of variance).

With regard to claim **16**, Baroni teaches: The method of claim 1, wherein said mathematical expressions comprise equations for calculating a global mean value and/or a variance of a number of demands present at a node or connected to a means of bandwidth management (page 245, Table 1 and equations (4) and (5); page 248, equation (9)).

With regard to claim **17**, Baroni teaches: The method of claim 16, wherein said demands comprise at least one demand selected from the group consisting of uniform

demands, random demands, and distance dependent demands (page 243, last ¶ in 1st column).

With regard to claim **18**, Baroni teaches: The method of claim 16, wherein said means of bandwidth management comprises a means selected from the group consisting of an electronic cross- connect, an IP router, a multi-service platform, an optical cross-connect, an optical router, and an optical add/drop multiplexer (page 242, 2nd ¶ under heading “I. Introduction”).

With regard to claim **19**, Baroni teaches: The method of claim 16, wherein said means of bandwidth management comprises a combination of electronic and optical bandwidth management (page 248, last ¶; page 243, 2nd ¶; page 242, 2nd ¶ under heading “I. Introduction”).

With regard to claim **20**, Baroni teaches: The method of claim 1, wherein said mathematical expressions comprise equations for calculating a value of the number of demands present at a node or connected to a means of bandwidth management (i.e., page 243, Figure 1 and 2nd column, 1st ¶; the number of demands present at a node is equal to N – 1).

With regard to claim **22**, Baroni teaches: The method of claim 20, wherein said demands comprise at least one demand selected from the group consisting of uniform

demands, random demands, and distance dependent demands (page 243, last ¶ in 1st column).

With regard to claim **23**, Baroni teaches: The method of claim 20, wherein said means of bandwidth management comprises a means selected from the group consisting of an electronic cross- connect, an IP router, a multi-service platform, an optical cross-connect, an optical router, and an optical add/drop multiplexer (page 242, 2nd ¶ under heading “I. Introduction”).

With regard to claim **24**, Baroni teaches: The method of claim 20, wherein said means of bandwidth management is a combination of electronic and optical bandwidth management (page 248, last ¶; page 243, 2nd ¶; page 242, 2nd ¶ under heading “I. Introduction”).

With regard to claim **25**, Baroni teaches: The method of claim 1, wherein said mathematical expressions comprise equations for calculating a global mean value or a local value of a number of bandwidth management subsystems (page 245, Table 1 and equations (4) and (5); page 248, equation (9)).

With regard to claim **26**, Baroni teaches: The method of claim 1, wherein said mathematical expressions comprise equations for calculating a variance of the number

of bandwidth management subsystems (page 245, 2nd column, 2nd full ¶; the calculation of standard deviation implies calculation of variance).

With regard to claim **27**, Baroni teaches: The method of claim 1, wherein said mathematical expressions comprise equations for calculating a global mean value of the extra capacity necessary for network survivability (i.e., for possible single link failure restoration scenarios, $(\Delta N_\lambda/N_\lambda)_M$ and $(\Delta N_\lambda/N_\lambda)_{av}$ give maximum and average increments in the wavelength requirement (in %) (page 250, 1st column, Table III and 2nd ¶)).

With regard to claim **29**, Baroni teaches: The method of claim 1, wherein said mathematical expressions comprise equations for calculating a local value of the extra capacity required on a link or means of transmission for network survivability (i.e., in the case of uniform traffic demand (page 243, 1st column, last ¶), the local value of the extra capacity required on a link or means of transmission for network survivability, is equivalent to the global mean value of the extra capacity necessary for network survivability (page 250, 1st column, Table III and 2nd ¶).).

With regard to claim **30**, Baroni teaches: The method of claim 1, wherein said mathematical expressions comprise equations for calculating a cost of transmission of demands across the network (i.e., on page 249, in Figure 11, the solid line represents a savings of wavelengths versus a percentage of links added, which line corresponds to an equation for calculating a cost of transmission of demands across the network.

Reductions in the number of wavelengths may be achieved at the cost of more fiber added (page 249, the ¶ that spans the columns, and the 2nd ¶ in the 2nd column).).

With regard to claim **31**, Baroni teaches: The method of claim 1, wherein said mathematical expressions comprise equations for calculating a cost of bandwidth management of demands across the network (i.e., the solid line in Figure 11 represents savings of wavelengths versus percentage of links added, which line corresponds to an equation for calculating a cost of bandwidth management of demands across the network. Reductions in the number of wavelengths may be achieved at the cost of more fiber added (page 249, the ¶ that spans the columns, and the 2nd ¶ in the 2nd column).).

With regard to claim **32**, Baroni teaches: The method of claim 1, wherein said mathematical expressions comprise equations for calculating a ratio of cost of electronic and optical bandwidth management (i.e., equations for calculating average nodal degree (page 245, equation (4)), and for calculating increment in wavelength requirement for restoration (page 250, 1st column, Table III and 2nd ¶), may further be for calculating a ratio of cost of electronic and optical bandwidth management).

With regard to claim **33**, Baroni teaches: The method of claim 1, wherein said mathematical expressions comprise equations for calculating a ratio of cost of transmission and bandwidth management (i.e., equations for calculating average nodal

degree (page 245, equation (4)), and for calculating increment in wavelength requirement for restoration (page 250, 1st column, Table III and 2nd ¶), may further be for calculating a ratio of cost of transmission and bandwidth management).

With regard to claim **34**, Baroni teaches: The method of claim 1, wherein said mathematical expressions comprise equations for calculating a cost of the network (i.e., equations for calculating average nodal degree (page 245, equation (4)), and for calculating increment in wavelength requirement for restoration (page 250, 1st column, Table III and 2nd ¶), and for calculating the number of demands on a link (page 248, 1st column, equation (9)), may further be for calculating a cost of the network).

With regard to claim **35**, Baroni teaches: The method of claim 1, wherein said network comprises a network selected from the group consisting of a two-dimensional-single-tier mesh network, a two-dimensional-multi-tier network, a multi-dimensional network, and a multi-dimensional-multi-tier network (page 243, Figure 1; page 245, Table I).

9. Claims **36-38** are rejected under 35 U.S.C. 102(b) as being anticipated by **Kirby et al.** (US Pub. No. 20020120768) (hereinafter referred to as “Kirby”).

With regard to claim **36**, Kirby teaches: A computer-readable medium for storing a set of instructions ([0009]), which when executed by a processor, perform a method comprising:

determining quantities of required network variables using closed-form mathematical expressions for network-wide expectation values for mean quantities of the network variables ([0010], [0030], [0031]).

With regard to claim **37**, Kirby teaches: The computer readable medium of claim 36, wherein said method further comprises:

determining variations of a minimum number of required network variables using said mathematical expressions ([0010], [0030], [0031]).

With regard to claim **38**, Kirby teaches: A computer program product loadable into a computer for quantifying the needs and costs of a network, the computer program product comprising software ([0009]) for performing the step of:

determining quantities of required network variables using closed-form mathematical expressions for network-wide expectation values for mean quantities of the network variables ([0010], [0030], [0031]).

Claim Rejections - 35 USC § 103

10. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

11. Claims **4, 12, 13 and 21** are rejected under 35 U.S.C. 103(a) as being unpatentable over Baroni in view of **Al-Salameh et al.** ("Optical Switching in Transport Networks: Applications, Requirements, Architectures, Technologies, and Solutions", in *Optical Fiber Telecommunications IV A Components* (Kaminow, I. P., et al., Eds.), Academic Press, 2002, pp. 295–373) (hereinafter referred to as "Al-Salameh").

With regard to claim **4**, Baroni teaches: The method of claim 2 (see discussion above). Baroni does not teach, but Al-Salameh does teach: wherein the variance of the ratio of terminated to through traffic is determined using the following equation:

$\langle \rho' \rangle = 2/[1 + \langle h \rangle]$;

wherein $\langle h \rangle$ depicts the expectation value of a number of hops on the network (i.e., for a uniform network, the number of add/drop ports at each node is 2*A = 2*(N – 1) (page 304, Figure 1.7; page 303, last ¶). The number of input (output) ports required on the typical cross-connect is $\langle M \rangle = (N - 1)(1 + \langle h \rangle)$; (page 304, last ¶ and equation (1.1)). The ratio of terminated to through traffic $\langle \rho' \rangle = 2*A/\langle M \rangle = 2/[1 + \langle h \rangle]$, *in order to size the transport capacity to the demand* (page 301, 1st ¶)). Based on Baroni in view of Al-Salameh, it would have been obvious to a person having ordinary skill in the art at the time the Applicant's invention was made, to combine the teaching of Al-Salameh with the subject matter as taught by Baroni, in order to size the transport capacity to the demand.

With regard to claim **12**, Baroni teaches: The method of claim 1 (see discussion above). Baroni does not teach, but Al-Salameh does teach: wherein said mathematical expressions comprise equations for calculating a mean number of hops (page 305, 1st ¶), *in order to size the transport capacity to the demand* (page 301, 1st ¶)). Based on Baroni in view of Al-Salameh, it would have been obvious to a person having ordinary skill in the art at the time the Applicant's invention was made, to combine the teaching of Al-Salameh with the subject matter as taught by Baroni, in order to size the transport capacity to the demand.

With regard to claim **13**, Baroni in view of Al-Salameh teaches: The method of claim 12 (see discussion above). Al-Salameh further teaches: wherein said mean number of hops is determined using the following equation:

$\langle h \rangle = \{ (N-2)/(\langle \delta \rangle -1) \}^{1/2}$;

wherein N depicts a number of nodes in the network, and $\langle \delta \rangle$ depicts the average degree of the nodes (i.e., the average number of hops of a network may be estimated to within 10% accuracy using $\langle h \rangle = \{ (N-1)/\langle \delta \rangle \}^{1/2}$ (page 305, 1st ¶)). Here, the claimed values and prior art values do not overlap but are close enough that one skilled in the art would have expected them to have the same properties. *Titanium Metals Corp. of America v. Banner*, 778 F.2d 775, 227 USPQ 773 (Fed. Cir. 1985); see MPEP § 2144.05. Therefore, the limitations of claim 13 are rejected in the analysis of claim 12, and the claim is rejected on that basis.

With regard to claim **21**, Baroni teaches: The method of claim 20 (see discussion above). Baroni further teaches: wherein the number of demands present at a node is determined using the following equation:

$\langle P_1 \rangle = \langle d \rangle + \langle W^0 \rangle \langle \delta \rangle$;

wherein $\langle W^0 \rangle$ depicts the expectation value of the number of demands carried on a link, $\langle \delta \rangle$ depicts the average degree of nodes in the network, and $\langle d \rangle$ depicts the mean number of demands terminating at a node (i.e., the average number of demands at a node = (N – 1) (page 243, 2nd column, 1st ¶). Substituting equation (4) and (N – 1) = $\langle d \rangle$ into equation (9) gives average demands on a link = $\langle d \rangle \langle h \rangle / \langle \delta \rangle = \langle W° \rangle$. The average number of input (output) ports required on the typical cross-connect $\langle P_1 \rangle = (N - 1)(1 + \langle h \rangle) = \langle d \rangle (1 + \langle h \rangle) = \langle d \rangle + \langle d \rangle \langle h \rangle = \langle d \rangle + \langle W° \rangle \langle \delta \rangle$ (page 304, last ¶ and equation (1.1)).).

Baroni does not teach, but Al-Salameh does teach:

$\langle P^{\kappa} \rangle$, $(1 + \langle \kappa \rangle)$;

wherein $\langle \kappa \rangle$ depicts the extra capacity for restoration (i.e., if a 50% overbuild for shared restoration is assumed, the average number of input number ports occupied on a cross-connect $\langle P^{\kappa} \rangle = \langle M \rangle = (N - 1)(1 + \frac{3}{2}\langle h \rangle)$, in which the overbuild factor $(1 + \langle \kappa \rangle) = \frac{3}{2} = (1 + 0.5)$, *for the purpose of network survivability* (page 305, 2nd ¶ and equation (1.2)).). Based on Baroni in view of Al-Salameh, it would have been obvious to a person having ordinary skill in the art at the time the Applicant's invention was made, to combine the teaching of Al-Salameh with the subject matter as taught by Baroni, for the purpose of network survivability.

12. Claim **28** is rejected under 35 U.S.C. 103(a) as being unpatentable over Baroni in view of **Weis** (US Pub. No. 20030067867).

With regard to claim **28**, Baroni teaches: The method of claim 1 (see discussion above). Baroni does not teach, but Weis does teach: wherein the global mean value of extra capacity is determined using at least one of the following equations:

$\langle\kappa\rangle \cong 2/\langle\delta\rangle$;

$\langle\kappa\rangle \cong 4\langle h\rangle/L$;

wherein $\langle\delta\rangle$ depicts the average degree of nodes in the network and $\langle h\rangle$ depicts the mean number of hops (i.e., where p is the percentage of overhead capacity for a network needed in addition *to make it restorable*, and d is the average node degree of the network, the relation holds that p*d=2 (Figure 6; [0050]). Solving this relation for p gives $p = 2/d = \langle\kappa\rangle = 2/\langle\delta\rangle$.). Based on Baroni in view of Weis, it would have been obvious to a person having ordinary skill in the art at the time the Applicant's invention was made, to combine the teaching of Weis with the subject matter as taught by Baroni, in order to make the network restorable.

Conclusion

13. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

- Baroni, S., et al., "Wavelength interchange in multi-wavelength optical transport networks" (in *Tech. Dig. 23rd Eur. Conf. Opt. Commun.*, vol. 3, Edinburgh, 1997, pp. 164–167), teaches that the number of wavelength-

channels utilised by active lightpaths is T_{min} = Nx(N-1)x H/2, where H is an average number of hops between node-pairs.

14. Any inquiry concerning this communication or earlier communications from the examiner should be directed to John Isom whose telephone number is (571)270-7203. The examiner can normally be reached on Monday through Friday, 9:30 a.m. to 6:00 p.m. ET.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, James Hwang can be reached on (571)272-4036. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/J. I./
Examiner, Art Unit 2447
3/27/2009

/Joon H. Hwang/
Supervisory Patent Examiner, Art Unit 2447